Harbour Seals in the Lacs des Loups Marins and eastern Hudson Bay drainage

T. G. Smith and G. Horonowitsch

Arctic Biological Station
Department of Fisheries and Oceans
555 St. Pierre Blvd.
Ste. Anne de Bellevue, Que. H9X 3R4

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ABSTRACT

Smith, T.G. and G. Horonowitsch. 1987. Harbour seals in the Lacs des Loups Marins and eastern Hudson Bay drainage. Can. Tech. Rep. Fish. Aquat. Sci. 1536: iv + 17 p.

Aerial surveys were flown in the Lacs des Loups Marins area during the period 18 February to 6 March 1986. We located 12 sites where significant open water existed in the lakes' system. No seals were seen hauled-out at any of these sites, but numerous other tracks were observed. We camped at one site midway along the narrows of Lacs des Loups Marins (approx. 56°31'N, 73°46'W) on 3-4 March. There we made one observation of a harbour seal swimming in an area of open water approximately 150 x 700 m in extent. Under-ice shoreline shelters caused by lowered water levels in the winter might provide important resting sites for seals, protecting them from low temperatures and predators. It is impossible at present to either estimate the numbers of seals or ascertain whether the population in Lacs des Loups Marins is a closed one. The sub-specific status of the seals is by no means definite. Radio-telemetry studies might be the best approach for future investigations.

Key words: harbour seal, Phoca vitulina, aerial survey, lacs des Loups Marins

RESUMÉ

Smith, T.G. et G. Horonowitsch. 1987. Phoques Communs dans les Lacs des Loups Marins et le Bassin Hydrographique de l'est de la Baie d'Hudson. Rapp. tech. can. sci. halieut. aquat. 1536: iv + 17 p.

Douze endroits d'eau libre ont été repérés, lors d'un recensement aérien accompli entre le 18 février et le 6 mars 1986 dans la région des Lacs des Loups Marins. Aucun phoque n'a été aperçu sur la glace ou dans les bassins d'eau libre, mais plusieurs pistes d'autres espèces de mammifères terrestres ont été repérées au bord des étangs. Au campement du 3 et 4 mars, situé dans la partie étroite à mi-chemin du Lac des Loups Marins (approx. 56°31'N, 73°46'W), un phoque commun nageant dans un étang d'une superficie d'environ 150 x 700 m a été observé. Les espaces sous la glace le long du lac, dûs aux bas niveaux d'eau pendant l'hiver, peuvent servir d'abris aux phoques contre les intempéries et prédateurs. Il est impossible à ce stade d'estimer l'abondance des phoques ou de caractériser leur population (e.g. population fermée) aux Lacs des Loups Marins. La taxonomie de ces phoques n'a pas encore été définie avec certitude. Pour des études futures, l'emploi de méthodes de radio-télémétrie serait préférable.

Mots clés: phoque commun, Phoca vitulina, recensement aérien, lacs des Loups Marins

INTRODUCTION

In response to a need for further information on the harbour seals inhabiting the Seal Lakes of the Ungava peninsula we conducted a winter aerial survey and ground observations during the period 18 February to 6 March 1986.

The presence of harbour seals in the lakes of the interior Ungava peninsula was first reported by Low (1898). Twomey (1939) reported on two specimens taken north of Lower Seal Lake in March 1938. These were described as a subspecies Phoca vitulina mellonae by Doutt (1942). On a return summer visit to the Lower Seal Lake area (Doutt 1954) only 4 or 5 seals were sighted during a 17 day stay and no specimens were collected. Since that time seals have been sighted and reported by several researchers working in the Seal Lake areas (Power and Grégoire 1978; Berrouard 1984). Sightings have been confined to the Lower Seal Lake (Lacs des Loups Marins) although there is an indication from old reports (Doutt 1942) that Indians had in the past hunted seals in Upper Seal Lake.

METHODS

Reconnaisance flights from Kuujjuarapik were flown in a ski equipped DHC-2 Beaver on 21 and 24 February and 5 March 1986. The main shoreline and tributaries of Lower Seal Lake (Lacs des Loups Marins) were surveyed from altitudes of 100-220 m A.G.L. (Fig. 1). All open water areas (OWA) were noted and subjectively evaluated for their potential as seal habitats. Tracks in the snow were examined. A landing was once required to ascertain whether a set of tracks was made by a seal.

On 3 March we established a camp at 56°31'N, 73°46'W, an open water area where Lower Seal Lake narrows approximately midway along its total

extent. We remained there until 5 March during which time we watched for seals and made observations of the ice and open water habitat.

RESULTS

Description of the area

Lacs des Loups Marins (Lower Seal Lake), hereafter referred to as LLM, is located between 56°18'N to 56°42'N and 73°05'W to 74°20'W (Fig. 2). It is a narrow and very irregular lake with hundreds of islands. The bulk of the lake lies along a SW-NE axis with a current flowing SW from NE. It lies at an altitude of 249 meters and consists of 2 basins connected by a fairly narrow passage, parts of which do not freeze due to strong currents and shallow depth. Its main outflow is via the Nastapoka river which descends, gradually, about 160 kilometers, over hundreds of rapids, towards Hudson Bay in a slightly N of W direction. Lac de Sem, which lies just a few km NE of LLM, empties to the NE to form the headwaters of the Mélèzes river.

The main tributaries of LLM originate in 4 reservoirs: (1) Lac Bourdel - NNW of LLM - 249 meters above sea level (same as LLM). There is rapid flowing open water at sites #12 and #13 (Fig. 3) in narrows between it and LLM. (2) Petit Lac des Loups Marins - SSE of LLM - 317 meters above sea level, with rapids at sites #9 and #10 (Fig. 4). (3) Lac Bourg - S of LLM - 283 meters above sea level, with a set of rapids at site #18 joining it to LLM (Fig. 5). (4) Baie Pikutachikw - SE edge of LLM - 254 meters above sea level, with a connection to LLM at site #11 (Fig. 6). Other OWA resulting from inflowing currents were found at sites #6, #8, #19, and #20 (Fig. 1). Outflowing currents produced OWA at site #1 (Figs. 1 and 7 -

start of the Nastapoka). Site #4 (Figs. 1 & 8) with extensive OWA was located in a narrowing in the mid section of LLM.

Aerial Reconnaissance

Three flights lasting 8.25 hrs were flown over the study area. We identified 12 sites (numbered 1-20; Fig. 1) where there was open water. At each of these locations we circled at low altitude looking for signs of seals and took careful note of the surrounding habitat.

Site #1 Approx. 56°28'N x 74°14'W (Fig. 7). Series of pools along main channel at the head of the Nastapoka river. Main drainage route out of the lake. Berrouard (1984) photographed seals near these pools on 19 April 1984. Fast flowing water without rapids.

Site #4 Approx. 56°31'N x 73°46'W (Fig. 8). Series of large pools in a narrow passage separating the 2 main basins constituting LLM. Fast moving water without rapids, flowing from NE to SW. Berrouard (1984) photographed seals in and near the main pool on April 15 and 19, 1984. We saw one seal swimming here on 3 March, 1986.

Site #6 Approx. 56°39'N x 73°13'W (Fig. 1). Single pool about 10 m wide and 1 m deep; fast-moving, 25 m long. Current flowing into LLM. We landed here to investigate otter tracks.

Site #8 Approx. 56°43'N x 73°07'W (Fig. 1). Very narrow streams with OWA; fast moving and shallow, or rapids flowing into LLM. A few km NE of here is Lac de Sem which is the headwater lake of Rivière aux Mélèzes.

Site #9 Approx. 56°32'N x 73°12'W (Fig. 4). About 4 km of river with a series of very strong rapids. Total vertical descent of about 28 m. Water entering LLM from Petit Lac des Loups Marins and southern sources.

Site #10 Approx. 56°30'N x 73°07'W (Fig. 4). About 4 km of river with a series of OWA with varying rates of turbulence. Total vertical drop is about 22 m. Water entering LLM from Petit Lac des Loups Marins and eastern sources.

Site #11 Approx. 56°27'N x 73°25'W (Fig. 6). Water descends about 5 m in less than 1 km over 3 or 4 sets of rapids. Pikutachikw Bay empties through here into LLM. Berrouard (1984) sighted seals here on 14 April, 1984.

Site #12 Approx. 56°38'N x 73°47'W (Fig. 3). See description for site #13.

Site #13 Approx. 56°39'N x 73°49'W (Fig. 3). Narrow passages between Lac Bourdel and LLM. Over a 3 km distance, several large pools with fast flowing water, even though the charts show no water-level difference. Berrouard (1984) sighted 1 seal in this area on 19 April 1984. We also think that this is the area where Doutt shot his 2 type specimens in 1938 (Twomey 1939). Upstream of site #13 are more OWA.

Lac Bourdel - This maze of land and water has less relief than LLM. It appears to be shallower, is less distinct and its shore-line impossible to follow. It seems to be a water collecting area from northern and western sources. It drains into the Nastapoka; primarily through the LLM to the southeast and also directly to the southwest.

Site #18 Approx. 56°19'N x 73°53'W (Fig. 5). This site is about half way along a 13 km stretch of river joining Lac Bourg and LLM. There are about 20 sets of rapids along this waterway with a major waterfall occurring only near Lac Bourg. Total drop is about 30 m. The river is narrow and water volume was not large.

Site #19 Approx. 56°15' x 74°00'W (Fig. 1). See description of site #20.

Site #20 Approx. 56°20' x 74°06' (Fig. 1).

Sites showing very small open water pools and small volume flows. There are no large or high water sources SW or W of LLM. In this area, near 56°18'N x 74°05'W, a barrier exists between the waters of LLM and Clearwater Lake. This is a "narrow ridge, scarcely more than 500 yds wide, and certainly less than a hundred feet in elevation" (Doutt 1942, p. 72). There is, therefore, no direct exchange of water between these two lakes. The water level in Clearwater Lake is about 10 m lower than in LLM.

Seal Observation from the Ground

We camped at Site #4 (Fig. 8) for 2 nights (3-4 March). On 3 March, at 1730 hr, as we were setting up camp, we saw a harbour seal in front of the camp. Only its head was visible as it swam upstream. As we watched, it turned its head to look at us; then slowly it swam forward, still with its head out of the water, dove, showing its back as it arched. Its hind flippers did not break the surface. Elapsed observation time was about 25 seconds. It did not reappear in the open water again. This was the only seal sighting of the trip.

The pool which we observed (Fig. 8) was about 150 m wide by 700 m long. From an elevation of about 10 m at our tent site, we could see a 350

m segment of it. The 3 pools downstream of our location were observed at regular intervals.

The perimeters of the pools were examined carefully for signs of seals, but none were found.

Ice Conditions on the Lake

Apart from the open water areas, LLM was totally frozen over. Twomey (1939) reported that he had to go through 3 feet of ice to reach water in some parts of the lake. We saw no ridges or other deformations of the ice surface on LLM, as compared to Clearwater Lake which was obviously cracked into many sections with high pressure ridges.

We examined the ice and noted a particular feature which might be important to seals. This observation was made by Doutt in 1938 (Twomey 1939, p. 137). At freeze-up the water level of the lake is very high. As winter progresses, ice thickens and water levels fall due to reduced run-off. Ice sags and breaks near shore. In most instances the ice is very well anchored at the shore-line supported by irregularities or rocks on the beaches. As water levels recede, the anchored ice breaks where it is not supported and changes into a step-like formation of ice sheets (Fig. 9). On the surface these steps are not usually obvious since they are covered by snow. It appears from our observations at site #4 that there was a reduction of about 1 m in the water level between freeze-up and early March.

Beneath these shoreline ice-steps the water recedes leaving behind connected air chambers of varying heights depending on bottom topography and supporting structures. Chambers with access to deep water may make very adequate seal lairs. In fact, the entire shore-line might serve as a contiguous breathing chamber for overwintering seals.

DISCUSSION

Observations and specimens of harbour seals are confined to the Lacs des Loups Marins and the Nastapoka River, although unconfirmed reports also indicate that seals were once hunted in Petit Lac des Loups Marins. In addition to our single sighting in LLM we add the sighting made in 1986 by a canoer of a single seal 35-50 km upstream (56°32'N, 74°29'W) of the seaward exit of the Nastapoka and the sighting of possibly more than one seal in a pool (56°54'N, 76°25'W) at the base of the second waterfall from the sea (Dr. Fred Blake, Woodbury Minn. pers. comm. Aug. 1986). The latter sighting of seals between the two 30 m high waterfalls at the Hudson Bay end of the Nastapoka River suggests that such waterfalls are not absolute barriers to seals entering from the sea. It appears that the Nastapoka river and LLM provide the most favourable feeding areas for seals but it remains a mystery why other contiguous lakes such as Clearwater and Minto which have good fish populations (Power and Grégoire 1978) do not appear to contain seals. It is perhaps risky to exclude these as possible summering areas for seals since there have not been adequate surveys conducted at that time of year.

The winter distribution of seals while biased by the distribution of available open water areas is located in the narrow areas of LLM where the currents are sufficient to create openings in the ice. Some of these (#4, Fig. 8) correspond to areas where seals have been sighted and collected in the summer (Doutt 1942).

Because of the shoreline deformation of ice caused by dropping water levels (Twomey 1939) it would be possible for seals to obtain protection from the elements and potential predators such as wolves and foxes (Smith

1976) while distributing themselves around most of the shoreline of LLM in areas which are presumably close to good feeding.

The taxonomic status of harbour seals is not well documented. Doutt (1942) described them as a subspecies, P.v. mellonae on the basis of two specimens, but Mansfield (1967) argued that they did not appear to be distinct from P.v. concolor. The isolation of the population from the sea is also not certain. While the Mastapoka waterfalls appear to form an impassible barrier on the Hudson Bay side, several rivers, including the Rivière aux Feuilles, Rivière aux Mélèzes and Rivière DuGué, draining toward Ungava Bay could provide access. Hildebrand (Unpublished M.S. 1948, Arctic Biological Station) indicates that local knowledge in Ungava Bay pointed to a widespread occurrence of harbour seals in inland lakes which were collectively called Kasigiaksiovik (place of the harbour seal) by the Inuit. The advent of rifle hunting and the high desirability of harbour seal pelts for decorative use probably resulted in a rapid reduction in numbers of harbour seals in both the rivers and lakes close to Inuit hunting grounds.

Doutt's (1942) female specimen from LLM was pregnant which probably indicates that mating and birth occurs in the inland lakes. The few observations of seals made over the years do not give the impression of any sizeable concentrations of seals anywhere in these drainages, but do point to year round residency. Mansfield's (1967) interpretation that the area contains a resident population occasionally augmented by wandering seals entering from the sea and undertaking random overland migrations is a reasonable hypothesis. Harbour seals are known to travel considerable distances overland and direct evidence is presented by Doutt (1954) that this occurred in several areas in the LLM region. Conditions during the

freeze-up of river estuaries might promote such inland incursions when harbour seals linger to feed on charr moving up the rivers in the late autumn. Other species of arctic and antarctic seals occasionally become disoriented and end up considerable distances inland, sometimes at considerable height above sea level (Smith and Memogana 1977; Stirling and Kooyman 1971). A snow and ice covered river might make the bridging of obstacles such as waterfalls much easier than during the open water season.

RECOMMENDATIONS

Recent concerns about the population status in LLM are prompted by the possibility of reduced drainage into the lakes by hydro electric developments. Further studies would not be able to give precise estimates of the population and would not likely enable us to pinpoint the exact distribution. Some knowledge could be gained by attempting to capture and radio-tag seals using special live-capture nets (Smith et al. 1973). There is the risk of drowning some of the individuals which might be considered unacceptable if the population is very low. On the other hand it would provide specimens with which to assess the taxonomic status of the group. During the capture attempts, boat surveys could also be carried out to further document the habitat and test-fishing could be attempted to evaluate the production of the areas used by the seals. Radio-tagged seals could be followed throughout the summer and winter to ascertain which specific habitat features are important to the seal population and what factors control their distribution and numbers.

REFERENCES

Berrouard, D. 1984. Résultats d'une reconnaissance aérienne dans le but de repérer des sous-populations de phoques communs (Phoca vitulina) dans la région des Lacs des Loups Marins. Ministère de l'environnement, Direction Régionale du Nouveau-Québec. Rapport d'Etape. 19p.

Doutt, J.K. 1942. A review of the genus Phoca. Ann. Carnegie, Mus., 29: 61-125.

Doutt, J.K. 1954. Observations on mammals along the east coast of Hudson Bay and the interior of Ungava. Ann. Carnegie, Mus., 33: 235-249.

Mansfield, A.W. 1967. Distribution of the harbour seal, Phoca vitulina Linnaeus, in Canadian Arctic waters. J. Mammal. 48: 249-257.

Power, G. and J. Grégoire. 1978. Predation by freshwater seals on the community of Lower Seal Lake, Québec, J. Fish. Res. Board. Can. 35: 844-850.

Smith, T.G. 1976. Predation of ringed seal pups (Phoca hispida) by the arctic fox (Alopex lagopus). Can. J. Zool. 54: 1610-1616.

Smith, T.G. and J. Memogana. 1977. Disorientation in ringed and bearded seals. Can. Field-Nat. 91:181-182.

Smith, T.G., B. Beck and G.A. Sleno. 1973. Capture, Handling, and Branding of Ringed Seals. J. Wildl. Manage. 37(4):579-583.

Stirling, I. and G.L. Kooyman. 1971. The crabeater seal (Lobodon carcinophagus) in McMurdo Sound, antarctica, and the origin of mummified seals. J. Mammal. 52: 175-180.

Twomey, Arthur C. 1939. Needle to the North. The story of an expedition to Ungava and the Belcher Islands. Herbert Jenkins Ltd, London, 151p.

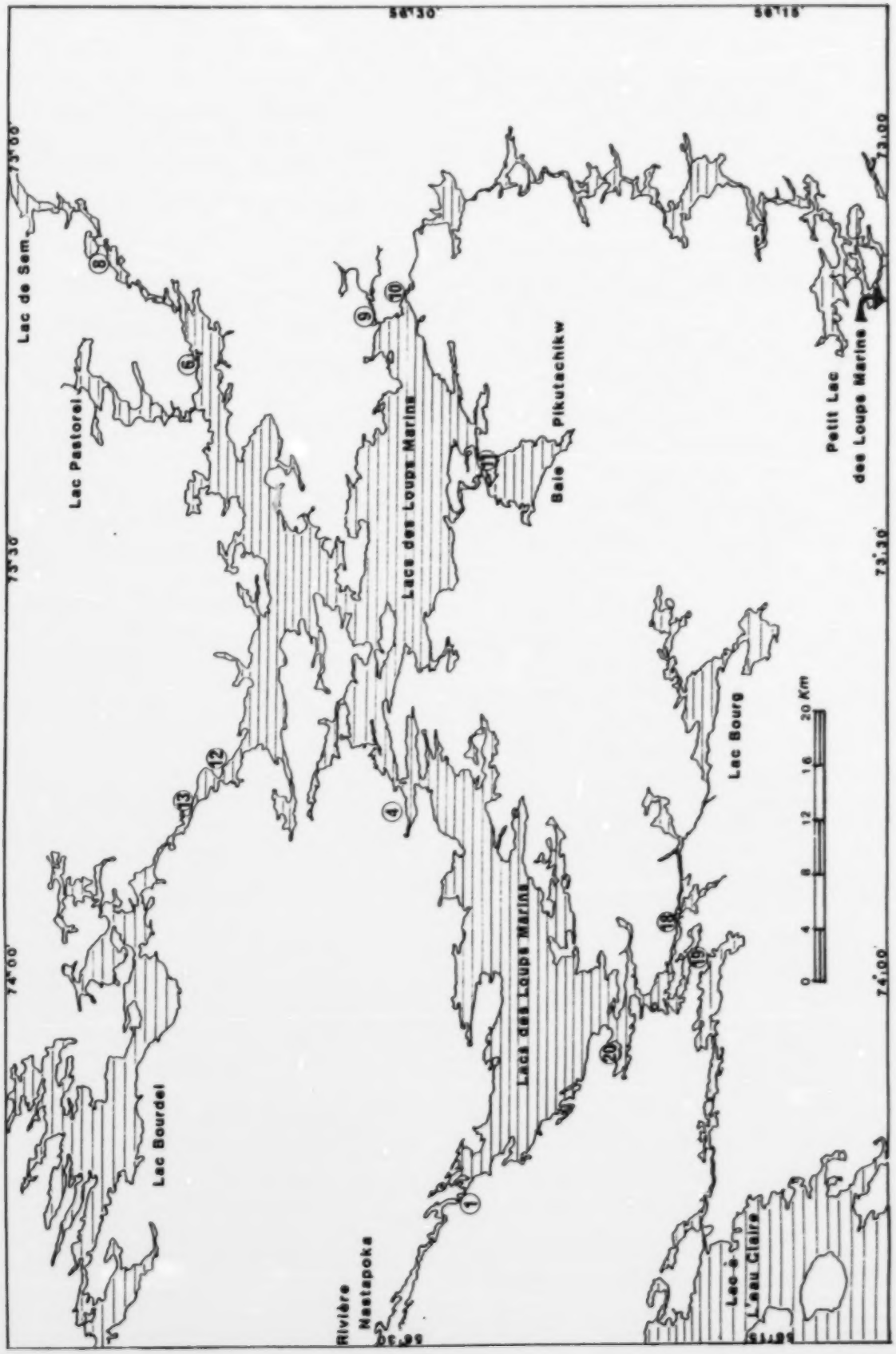
LIST OF FIGURES

Fig. 1 Map showing Lacs des Loups Marins, adjacent lakes and open water areas.

Fig. 2 Map showing Lacs des Loups Marins, Ungava Bay, Hudson Bay and the main river drainage system.

Fig. 3-8 Detailed maps (1:50,000 scale) showing open water areas.

Fig. 9 Sketch showing how under-ice chambers form around shoreline.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Lac Pastorel
Lac Bourdel
Lacs des Loups Marins
Baie Pikutachikw
Petit Lac
des Loups Marins
Lac Bourg
Lacs des Loups Marins
Rivière
Nastapoka
Lac à l'
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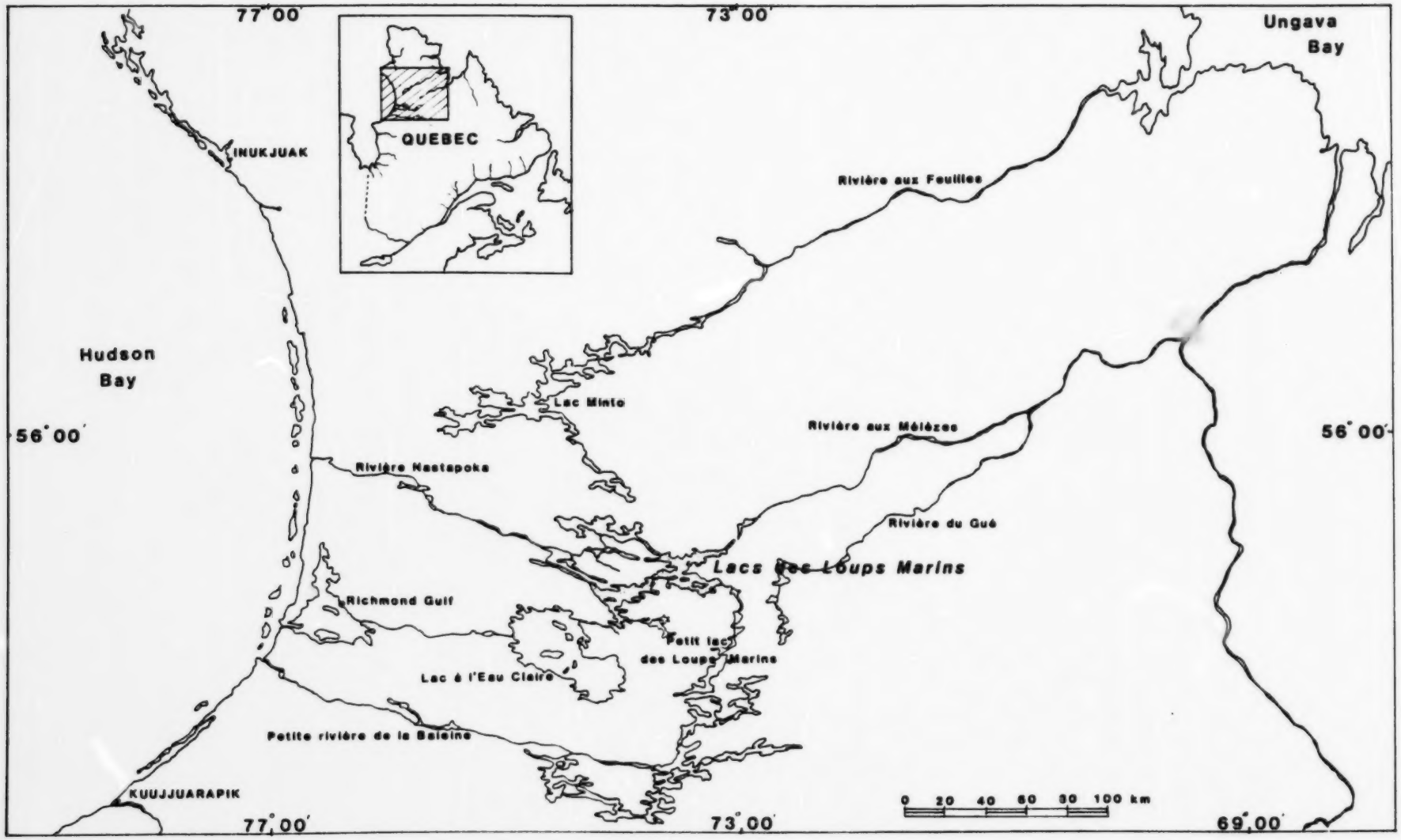
Fig 1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Hudson
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Lac Minto
Rivière aux Mélèzes
56°00'
56°00'
Rivière Nastapoka
Rivière du Gué
Lacs des Loups Marins
Richmond Gulf
Petit lac
des Loups Marins
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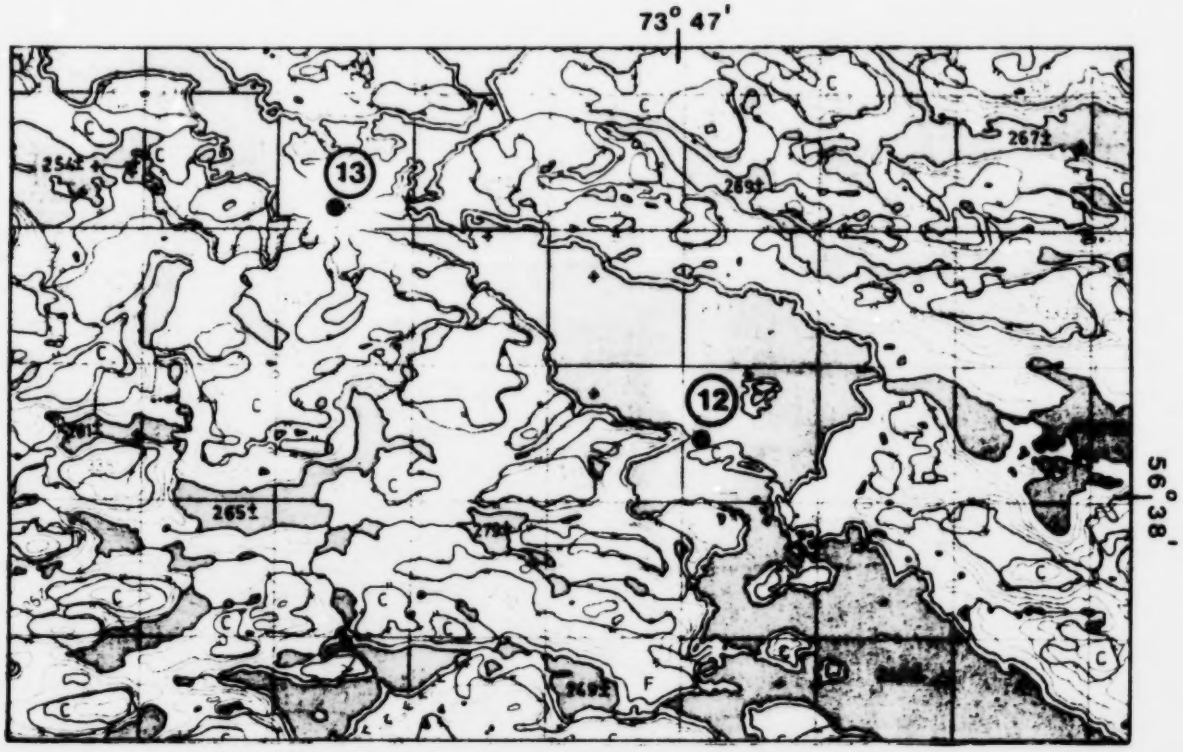
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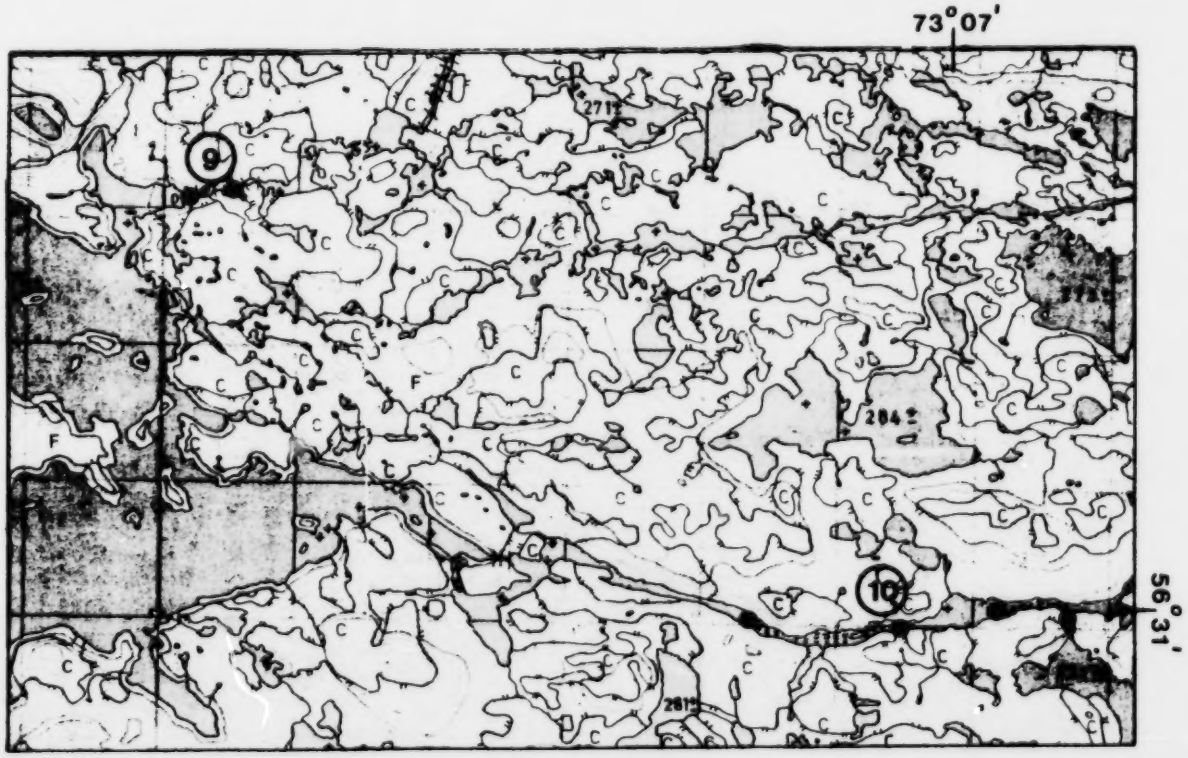
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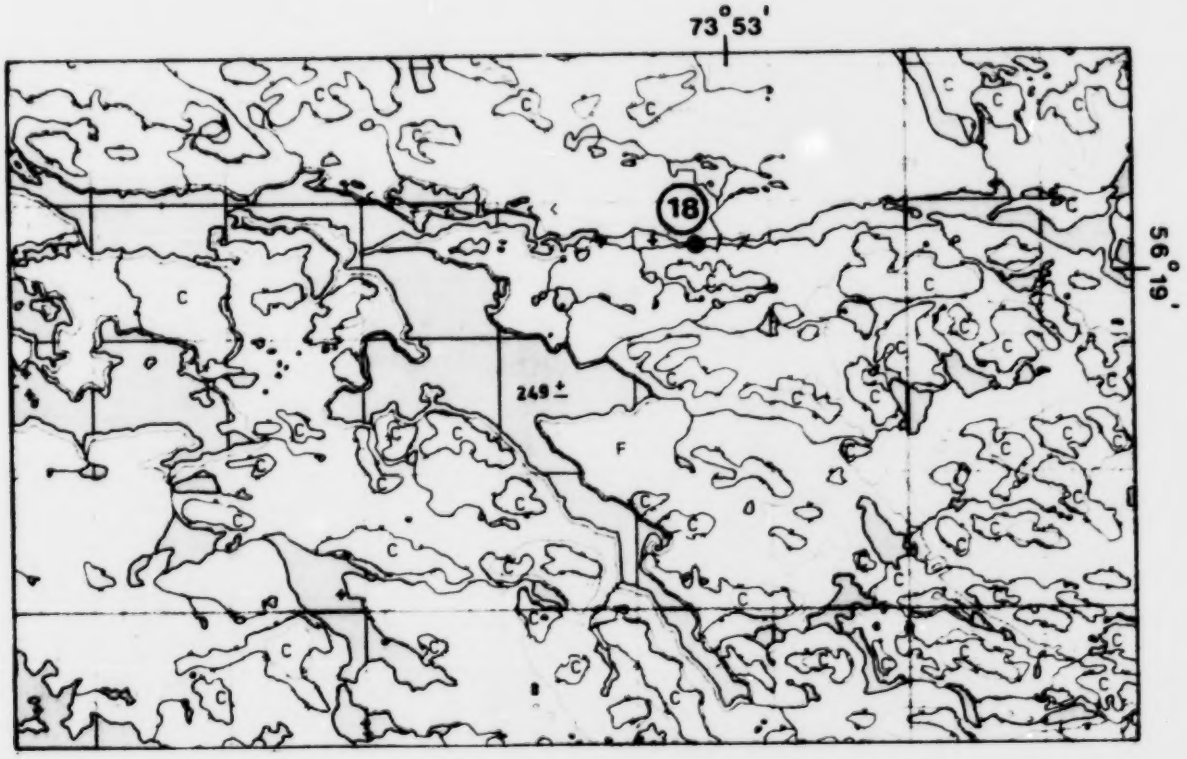

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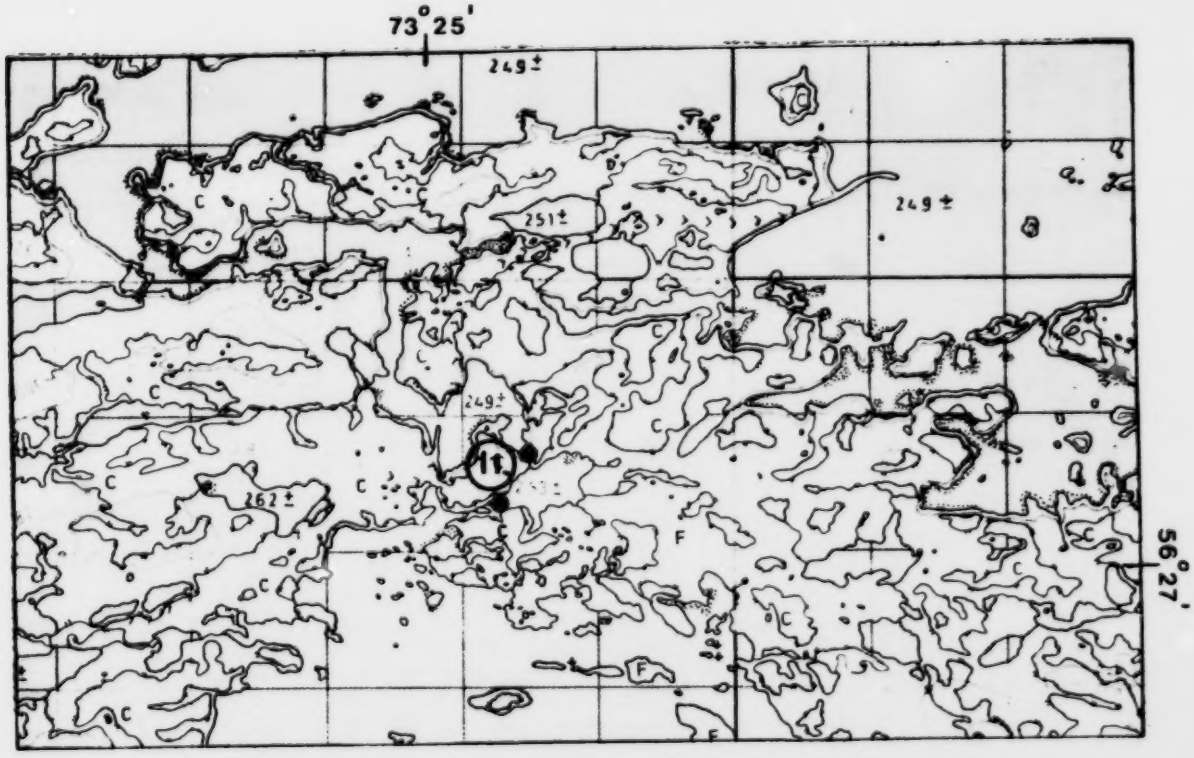

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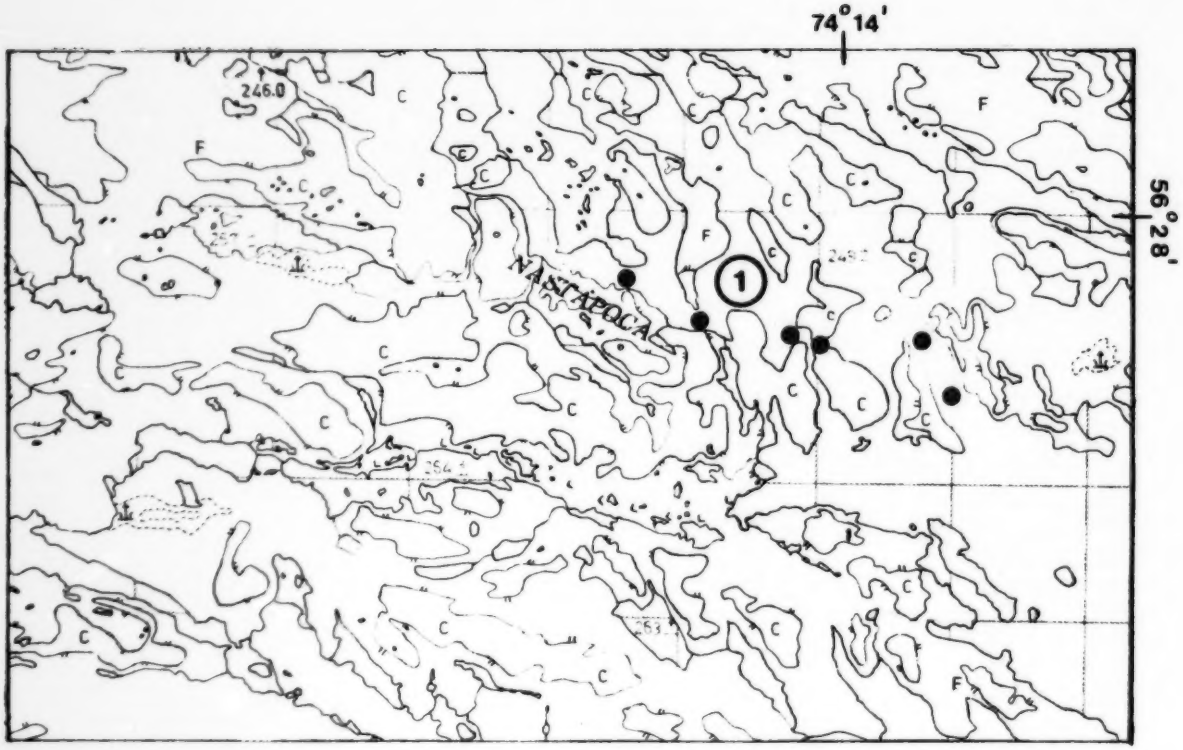

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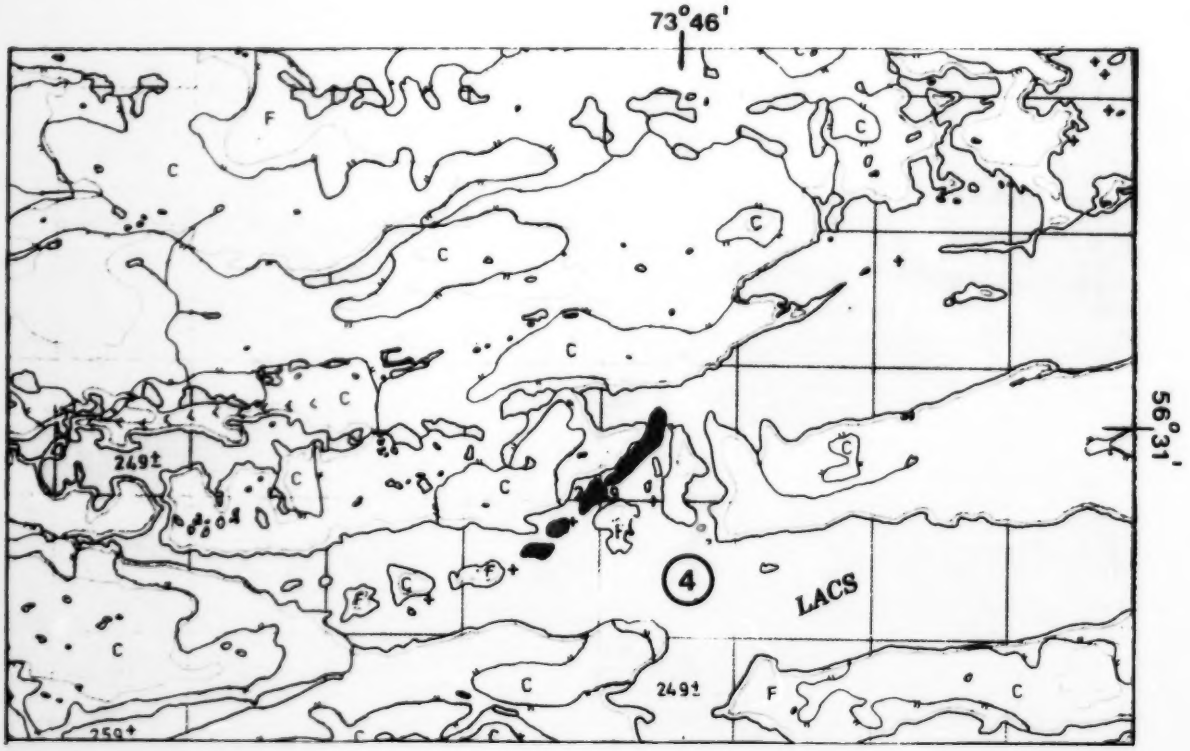

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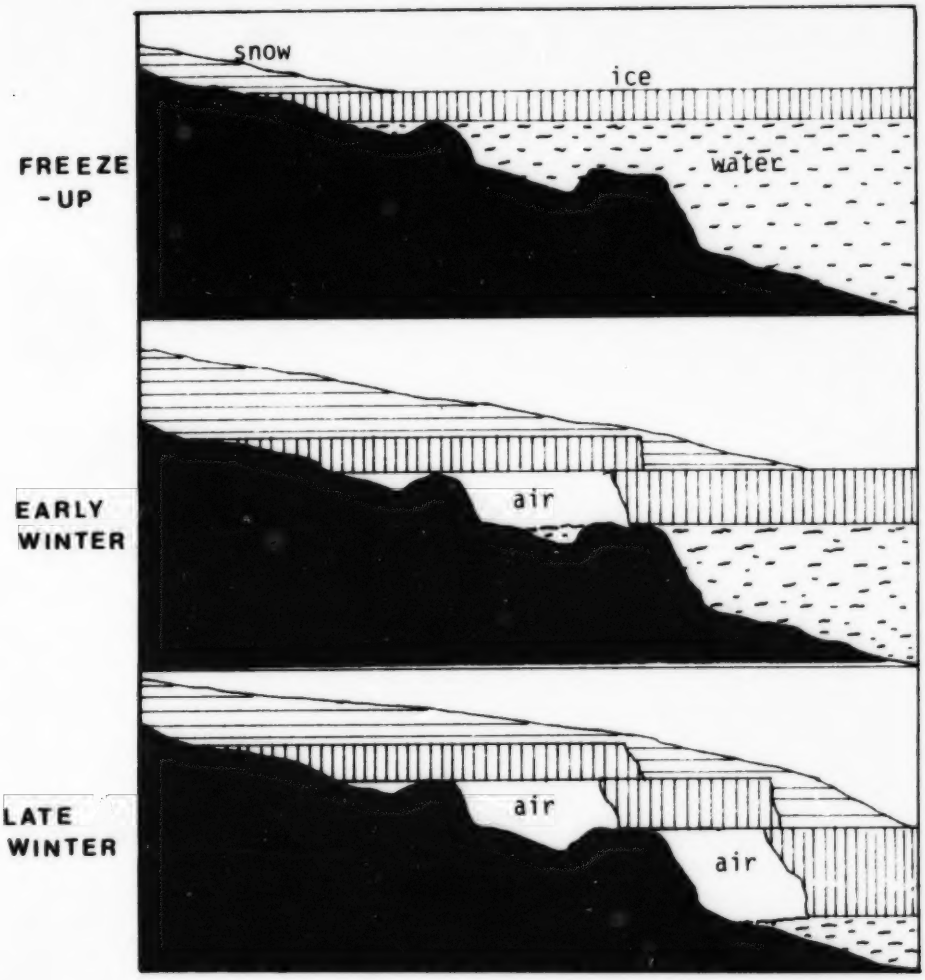
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WINTER

Fig 9